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# 1. Introduction

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## 1.1 Introduction

It's an exciting time to be a QGIS user. The release of QGIS 3 brings new and powerful features for both analysis and cartography.

The workflows demonstrated in this second edition can be applied throughout the life of the QGIS 3.4 Long Term Release (LTR)—a version kept up to date with bug fixes for at least a year—and beyond.

QGIS 3.x has too many enhancements to mention over the 2.x series. Take a look at the *Visual Changelog* for a list of the new and exciting features available.

In this book we demonstrate the latest cartographic capabilities to aspiring and current GIS professionals, provide reference material for great map designs, and serve as a source of mapping inspiration. This isn't a mere rehash of the first edition, rather, it is an exploration of the new techniques and capabilities in version 3.x by way of fourteen updated designs as well as twenty-three completely new maps.

A free and open-source software project, QGIS relies on, and benefits from, the varied community that supports it. As such, we encourage you to not only learn QGIS, but to get involved as well. There are many ways to help, including reporting bugs, participating in support forums, working on documentation, developing, and sponsoring. See the *Get Involved* page on the QGIS website<sup>1</sup> for more information.

### The Authors

Anita Graser is a long-time QGIS community and project steering committee (PSC) member who is well known for a blog<sup>2</sup> that explains and illustrates many of the newest QGIS features and plugins as they are released. She is the author of *Learning QGIS*<sup>3</sup> and co-author of the *QGIS 2 Cookbook*.<sup>4</sup> Graser works at the Austrian Institute of Technology and frequently

speaks on open source technology topics.

Gretchen Peterson publishes a blog<sup>5</sup> and is the author of *GIS Cartography: A Guide to Effective Map Design, Second Edition*<sup>6</sup>, *Cartographer's Toolkit: Colors, Typography, Patterns*,<sup>7</sup> which focus on teaching cartographic techniques, and *City Maps: A Coloring Book for Adults*<sup>8</sup>. Peterson speaks on cartography and runs the cartography consulting firm PetersonGIS.

By combining our skills, the goal was to create a second edition that would teach map design using the latest features and enhancements found in QGIS 3. Much of the breadth of QGIS cartographic functionality is covered in the most up-to-date map styling possible. The result is this second edition, and we hope that it opens you up to new possibilities in mapping and inspires you to show off your data with even greater clarity and modernity.

Visual changelog:  
<http://loc8.cc/qmd/changelog>

### Who This Book Is For

The primary audience we had in mind when writing this book is existing QGIS users who are familiar with the basics of working with spatial data, but who don't necessarily have a lot of—or any—experience with the cartographic tools, including layer styling methods, labeling techniques, or print map design.

The book is also a good introduction to QGIS for GIS professionals who are experienced with other GIS software and map designers who are looking for inspiration and are eager to explore the behind-the-scenes making of some of most avant-garde cartographic techniques to-

1. <https://www.qgis.org/en/site/getinvolved/>
2. <http://anitagraser.com>
3. [http://loc8.cc/qmd/learning\\_qgis](http://loc8.cc/qmd/learning_qgis)
4. [http://loc8.cc/qmd/qgis\\_cookbook](http://loc8.cc/qmd/qgis_cookbook)
5. <http://blog.gretchenpeterson.com/>
6. [http://loc8.cc/qmd/gis\\_cartography](http://loc8.cc/qmd/gis_cartography)
7. [http://loc8.cc/qmd/cartographers\\_toolkit](http://loc8.cc/qmd/cartographers_toolkit)
8. <http://loc8.cc/qmd/citymaps>



day. The book focuses on static map design rather than web map development, though many of the styling and labeling techniques can be applied to web maps as well.

## How The Book Is Organized

This book is comprised of recipes of map designs and accompanying instructional texts. The recipes are ordered within each of the three main parts from easy, medium, difficult, to somewhat insane. These difficulty levels also largely correspond to the length of time needed to complete each recipe, which is indicated by the recipe's time wheel at the top of the page. The three main chapters are also progressive, starting with layer styling, moving to labeling, and finally print map design.

In some cases, recipes build on each other, such as in the case of "Applying Graduated Symbol Sizes", on page 21, which leads into the "Configuring Label Expressions and Leader Lines" recipe, on page 99, which is further adapted in the "Customizing Legends" recipe, on page 161. In these instances, the recipes indicate the progression and can be started from scratch or from the supplied project file.

For the most part, once a concept has been introduced (e.g., how to place halos around labels), the specific steps needed to produce that effect will not be repeated. This means that not every single step needed to complete the recipes is spelled out in detail, especially in the longer recipes near the end of the chapters. For example, the procedure to change the projection is detailed in the first recipe, "Applying Graduated Symbol Sizes", on page 21. Subsequent recipes indicate when a change in projection is needed along with the correct projection parameters but don't detail the procedure.

The beginning QGIS user may find it easier to begin with the simpler recipes and work through the book in order. Furthermore, more advanced QGIS users will appreciate getting to the substance of the design in the later recipes rather than wading through the technical minutiae.

## Further Learning

The QGIS Training Manual<sup>9</sup> and the QGIS User Manual<sup>10</sup> provide much of the information needed to get started with QGIS and to look up specific functionality. Besides these on-line resources, there are multiple books on different QGIS topics listed on the project website.<sup>11</sup>

The QGIS API Documentation<sup>12</sup> and the QGIS PyQGIS Cookbook<sup>13</sup> are the definitive sites for developer resources. GIS StackExchange<sup>14</sup> is also a great place to post QGIS questions and search for answers.

## Acknowledgments

We would like to thank Jonah Adkins and Brian Timoney for early map design critique and Matt Pettis for his help in locating U.S. election data. Adkins designed two maps for the book for which we are very grateful: Configuring Advanced Halos and Creating Automated Reports. Andreas Neumann provided label oversight for the Designing Label Hierarchies recipe. Joshua Stevens and Mickael Hoarau provided inspiration for the Mapping Economy and Income Using Bivariate Choropleths recipe and the Designing Infographics recipe, respectively. The shapeburst fill bonus recipe was influenced by Klas Karlsson's excellent tutorial on rustic styling in QGIS. We thank everyone on Twitter who contributed thoughts on the correct terminology for pairwise line labeling. Nyall Dawson's blog post, "About Label Halos" was heavily relied on in the crafting of the advanced halos recipe.

We would also like to thank the peer reviewers: Katherine Hurley, Sara Safavi, Nyall Dawson, Johannes Kröger, and Lene Fischer. We are indebted to the Natural Earth project, led by Nathaniel Kelso and Tom Patterson, for the bulk of the data used in the book's map designs and to the contributors of OpenStreetMap for the data used in other designs. Finally, the

9. <http://loc8.cc/qmd/qgis-training-manual>

10. <http://loc8.cc/qmd/user-manual>

11. <http://loc8.cc/qmd/qgis-books>

12. <http://qgis.org/api/>

13. <http://loc8.cc/qmd/dev-cookbook>

14. <http://gis.stackexchange.com/>

authors wish to thank our tireless editor and publisher Gary Sherman, the founder of QGIS and owner of Locate Press.

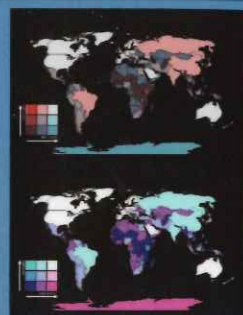




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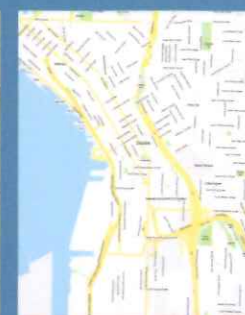
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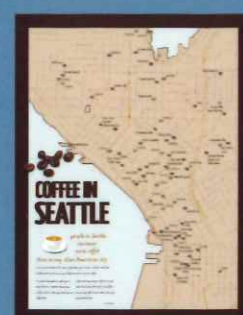
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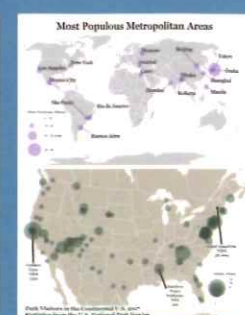
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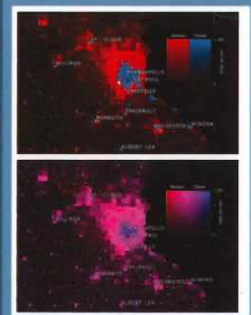
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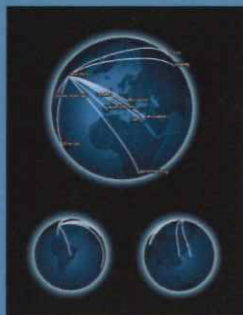
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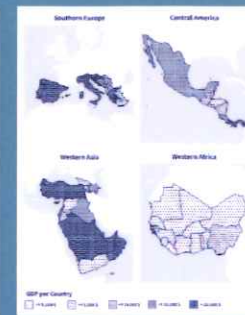
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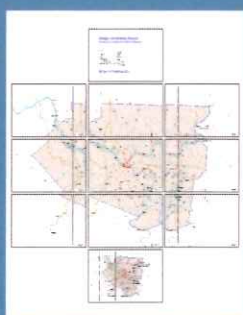
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*Building on the first edition, the authors take you step-by-step through the process of using the latest map design tools and techniques in QGIS 3. With numerous new map designs and completely overhauled workflows, this second edition brings you up to speed with current cartographic technology and trends. Advanced skills are now easy to learn!*

**See a map you like? Jump to the page and get mapping!**

